



Classroom at Crater Lake

Teacher Guide
Spring Field Trip 2016



Thank you for choosing to bring your students to Crater Lake National Park for a memorable learning experience!

Crater Lake National Park is always a great place to visit to witness inspirational landscapes and to commune with nature. If you can set aside some class time before and after the trip, we've designed some learning extensions that will augment your students' science education experience while at the park. Please read through this guide so that your students are best prepared for this adventure.



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Program Sequence

Pre-field trip (optional): Students will complete the *Crater Lake National Park - Spring Study Guide*. In this guide, they will research winter ecology at Crater Lake and develop a testable prediction regarding mountain hemlock phenology before going out into the field.

Field trip: Students will bring their knowledge and hypotheses to the rim of Crater Lake for a snowshoe adventure. Classes of chaperone-led small groups will work with a park ranger to gather authentic snow depth and phenology data for use back at school. They will also accompany the park ranger on an activity-filled snowshoe hike to explore and learn about how snow affects Crater Lake's living community.

Post-field trip (optional): Students will access the dataset (to which they contributed) online using a Geographical Information System (GIS). They will analyze the data to complete the *Crater Lake National Park - Natural Resources Report*.

Rationale

The spring 2016 *Classroom at Crater Lake* program invites students to experience winter recreation at Crater Lake while taking the front seat in a citizen science project utilizing authentic 21st century science technology. Students will employ the scientific method to make observations, think of interesting questions, formulate hypotheses, develop testable predictions, gather data to test their predictions, and analyze a shared dataset looking for evidence to support or reject their hypotheses. They will also snowshoe, interact with park rangers, and explore immense natural beauty.

The program aligns with Oregon science standards for the 4th and 5th grades. The focus on these standards combined with the authentic use of the scientific method provides an enriching science education experience appropriate for grades 4-8. The use of teacher-designed lesson extensions and adaptations will accommodate age groups outside of this range.

Students will give back to the park by providing park scientists with valuable phenology data that can be used to track environmental changes and inform future park management decisions. Citizen science is service learning in science education!

Program Mission

The mission of *Classroom at Crater Lake* is to enhance local communities' understanding and appreciation of the natural and cultural histories of Crater Lake National Park. The mission is achieved by utilizing the park as a natural learning laboratory, providing teachers and students ranger-guided, place-based environmental education activities aligned with nation-wide science education standards and the mission of the National Park Service.

Program Goals

The goals of spring 2016 *Classroom at Crater Lake* are:

- To engage students in the authentic, ongoing process of the scientific method through a citizen science project.
- To improve attitudes towards stewardship of our national parks, other public lands, and Earth as a whole.
- To introduce students to winter recreation and safe travel in the Oregon High Cascades.

Student Learning Outcomes

Students who demonstrate understanding can:

- Employ each step of the scientific method to add to the scientific understanding of natural process at Crater Lake National Park.
- Predict relationships between snow depth and needle growth on mountain hemlock trees.
- Use authentic tools to locate study area, assess needle growth, and measure snow depth.
- Analyze phenology and snow depth data using GIS, finding evidence to support or reject their hypotheses.
- Evaluate how the condition of the snowpack affects the living communities in and around Crater Lake National Park.
- Travel safely off-trail using snowshoes.

2014 Oregon Science Standards (NGSS)

Focus Standard

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

Supporting Standards

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

Background Information

Students will investigate interactions between the *cryosphere* (snowpack), and the *biosphere* (community of living things) at Crater Lake National Park. Snow covers the park's landscape for eight months of the year, creating a selective pressure so great that species living in the park year round inherit extreme winter survival adaptations to survive. In fact, many of the species at Crater Lake are so well adapted to cold, snowy winters that park scientists are concerned that they may be threatened by a warming climate.

When students visit the park between April and May, an average of five to ten feet of snow will cover the ground. At first glance, it's easy to assume that the ecosystem is in dormancy, waiting to thaw. The students will observe plant growth and evidence of animal activity to discover how energy and matter continue to flow through the ecosystem during the snowy months.

Phenology is the study of the timing of cyclic natural phenomenon, e.g. when leaves begin to develop on a tree, or when a bird begins to migrate. During the citizen science project, students will investigate how Crater Lake's legendary snow depth relates to the timing of needle growth on mountain hemlock trees. Ideally, students will have already completed the *Spring Study Guide* at school and have already crafted a hypothesis (a prediction of what they'll discover). When students return to the classroom, they will be able to analyze all of the project's data using an online map to support or reject their hypotheses. This will allow students to observe their work, "complete" the scientific method, and get a taste for authentic field science.

This project is important to park scientists and managers because forests at Crater Lake are already showing impacts of climate change. The park needs to monitor the situation so wise management decisions can be made in the future. All data will be recorded and uploaded to a public online map.

Classroom at Crater Lake

Program Schedule 10:00 am – 1:15 pm

10:00 am - Groups arrive at the Crater Lake Rim and park in front of the Community House.

- Snowy roads in the park will increase transportation time, so please plan accordingly.
- The bus should go directly to the Rim and **not stop at the Visitor's Center**.
- **Ranger boards the bus** to welcome the group and explain the schedule.
- Students use the **restroom, eat a hearty snack** and **dress** for the weather!
- **(Note the late lunch time). Please pack out your group's trash.**
- Students should carry their backpack with extra clothing and a **water bottle**.

10:20 am - Meet ranger in designated area to put on snowshoes. Please see the clothing list to ensure student safety.

***Note:** Students should be pre-assigned to **FIVE small groups** (5-7 students/group) with a chaperone assigned to each group. In the spring, laminated name tags on a string work much better than the stick-on type.*

10:45 am - Snowshoe Activity Begins.

- Content focus is on exploration, snow/watersheds, adaptations, and stewardship.
- **No Lunch Break:** In an effort to make the best use of outdoor exploration time at the park, rangers do not break for lunch! It is important that students eat a large snack prior to beginning the program. Please clean up the snack and pack out the trash.

1:00 pm - Snowshoe Activity Ends. Students return to the bus area and remove their snowshoes.

***Note:** Chaperones should be assigned to restrooms and as crossing guards to monitor student safety during all transition times.*

1:15 -1:45 pm - Lunch. Most groups use the restroom, eat lunch on the bus and leave the park about 1:15 pm. Other schools with a more flexible schedule use the restroom, eat lunch, take group photos, visit the gift shop and enjoy the view! **It is requested that no more than 10 students (and their chaperones) be in the gift shop at any one time.**

***Note:** Chaperones must stay with and monitor groups closely during lunch.*

Lunch location options for spring: Students may eat near the bus, on the bus, on a snow bank, or upstairs above the Gift Shop in the Rim Cafe. Students on snow banks on the north side of the road (closest to the rim) **must be accompanied by a chaperone at all times.**

1:40 pm - Board Bus. Students board the bus after checking for litter.

1:45 pm - Bus leaves the rim of Crater Lake National Park

Thank you for helping us to promote and protect the wonders of Crater Lake National Park!

Classroom at Crater Lake

Spring Field Trip Clothing & Supplies Check-list

Spring snowfall at Crater Lake makes it a beautiful place to visit and explore, but one must be prepared! Snowfall averages 533 inches annually and by early spring it is typical to have 10 to 12 feet of snow on the ground. Spring daytime temperatures can range from 32* to 50°F. The wind can be fierce and the weather can change very quickly at Crater Lake!

Many students do not own all these items. Please encourage your students to borrow clothing, if possible. **To ensure a safe and warm experience, students, teachers, and chaperones need the following clothing to protect them from the wind and snow:**

- ◇ warm hat (students should have a hat even if their jacket has a hood)
- ◇ gloves or mittens (water resistant, “slippery” gloves work much better than fabric)
- ◇ water resistant snow boots (rubber rain boots could work with double socks) *
- ◇ long pants (snow pants are best) **
- ◇ long-underwear
- ◇ long-sleeve shirt (turtle necks are great)
- ◇ fleece sweater
- ◇ warm jacket
- ◇ scarf
- ◇ two pairs of thick socks (wool or wool blend is best)
- ◇ extra pair of dry shoes for the ride home!
- ◇ sunglasses
- ◇ sunscreen
- ◇ water bottle
- ◇ lunch (a big, healthy lunch!)
- ◇ snacks (healthy choices)
- ◇ back pack
- ◇ *Optional: camera and binoculars.*

It is best to have students **layer their clothing** and **bring dry clothing** to change into for the bus ride home! If students remove layers they can put items in their backpack.

*If water-proof boots are not available, wear double socks and put plastic bags over socks inside of shoes. Bread bags work well!

**If snow pants are not available, try a pair of nylon wind pants or athletic warm-up pants over two pairs of sweat-pants. Blue jeans are NOT a good choice.

Note for Teachers: Please bring extra clothing for students who might not be prepared and also bring a garbage bag to pack out waste generated during your visit.

Thank you!

Crater Lake National Park Field Trip

Chaperone Responsibilities

Thank you for volunteering to accompany the class to Crater Lake National Park. Your help and leadership are both critical to the success of the field trip!

Please be sure to check the packing list and dress appropriately. **Chaperones will be snowshoeing with the students** and your comfort is important, too!

During this trip your assistance with the following elements will be greatly appreciated:

Safety First!

Make sure students are following all safety rules and the directions given by the ranger or group leader. Please assist students when crossing the road and remind them to not feed the animals. All trash and snack wrappers should be collected. The wind often picks up wrappers and takes them “over the rim wall.” Please help to keep the students away from the rim of the lake. In the winter, the snow is very unstable and unpredictable. It is extremely dangerous.

Please stay with your students unless the park ranger suggests otherwise.

Try to learn the student’s names. Students often get excited when they are at the park and may need a gentle reminder to listen and show respect to the ranger leading the group. Help them with small group activities and data sheets – **but let the students do the thinking and the writing!** Please try to let the students answer the ranger’s questions.

Leaving the Group:

The students in your group must get permission from you to use the restroom or depart from the group for any reason. Please let the teacher know if you or someone in your group needs to be excused for a short time. Please accompany students to the restroom during a field session.

No Smoking/No Cell Phones:

Please also refrain from smoking anywhere near the students, bus, or on any hikes. We also ask that you not take (or make) phone calls during the programs.

Have Fun!

Please take time to enjoy the beauty and wonder of Crater Lake National Park!

Thanks again!